UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,136	10/31/2003	Tadashi Shiraishi	F-8019	3465

28107 7590 02/22/2007
JORDAN AND HAMBURG LLP
122 EAST 42ND STREET
SUITE 4000
NEW YORK, NY 10168

EXAMINER	
CARRILLO, BIBI SHARIDAN	
ART UNIT	PAPER NUMBER
1746	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/699,136	SHIRAISHI, TADASHI	
	Examiner	Art Unit	
	Sharidan Carrillo	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 6-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 6-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 7, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barry (42724007) in view of Sameshima (JP01-028625) and further in view of Withers Jr (4007774).

Barry teaches a method of cleaning pipes and tubes, in heat exchangers, using ice in combination with water (Abstract, col. 2, lines 60-65, col. 4, lines 25-45). Barry fails to teach the limitations of connecting the suction hose to the pipe and suction pump, connecting the ice-feeding hose to the pipe and supplying ice and water from the hopper into the pipe.

Sameshima teaches flushing a pipe using a carriage 1 with a suction pipe mounted thereon and waste water collecting tank 2 (Fig. 1, page 3). On page 5, Sameshima teaches cleaning with ice water until clean water flushes into the waste water collecting tank. Ice water enters port 12 and is suction pumped through the branch pipe and waste is collected in tank 2. On page 6, Sameshima teaches using the method for cleaning of a piping. Sameshima fails to teach cleaning heat exchangers.

It would have been obvious to a person of ordinary skill in the art to have modified the method of Barry to include using a suction hose and pump in connection with the pipe, in order to flush ice and water through the pipe, as taught by Sameshima, thereby cleaning the interior surface of the pipe of debris. In reference to the hopper, Barry et al. teach various magazines such as hoppers (Fig. 11), for storing ice particles and further transporting the pipe in the piping for cleaning. Additionally, it is conventional in the art to use hoppers for the generation and storage of ice particles (US5934566).

Barry in view of Sameshima fail to teach the limitations directed to the principle of reverse-flow. Withers Jr. teaches cleaning heat exchanger tubes by periodically reversing the fluid flow in order to remove coating deposits. It would have been obvious to a person of ordinary skill in the art to modify the method of Barry to include reverse flow, as taught by Withers, for purposes of effectively removing contaminants from the interior surface of the heat exchanger tubes. Additionally, the concept of enhanced cleaning by reverse flow is notoriously well known and conventionally practiced in the art (Thomas, 4,054,150; Edstrand et al. 5,680,877).

Barry in view of Sameshima and Withers Jr fail to teach a transparent portion of the ice feeding hose, as recited in claim 7. However, it would have been within the level of the skilled artisan to modify the method of Barry et al. to include a transparent hose since Barry teaches the need to detect the completion of the cleaning cycle by observing whether ice flows into the waste water collecting tank at a faster velocity. In reference to claim 9, it would have been within the level of the skilled artisan to adjust the ratio of ice to water in order to form an effective composition which would be easily flowable, yet effective for scrubbing the interior surface of the pipe. In reference to claim 11, Barry et al., (col. 3, lines 35-40) teaches that the diameter of the pig is selected to permit it to penetrate the lumen of the contaminated tube. Given the teachings of Barry et al, it would have been well within the level of the skilled artisan to modify the size of the ice cube depending upon the diameter of the heat exchange tubing being cleaned and the amount of contaminants present therein.

5. Claims 6, 8, 10 and12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barry (42724007) in view of Sameshima (JP01-028625) and further in view of Withers Jr (4007774) and further in view of Leon et al. (4327560).

Barry teaches a method of cleaning pipes and tubes, in heat exchangers, using ice in combination with water (Abstract, col. 2, lines 60-65, col. 4, lines 25-45). Barry fails to teach the limitations of connecting the suction hose to the pipe and suction pump, connecting the ice-feeding hose to the pipe and supplying ice and water from the hopper into the pipe.

Sameshima teaches flushing a pipe using a carriage 1 with a suction pipe mounted thereon and waste water collecting tank 2 (Fig. 1, page 3). On page 5, Sameshima teaches cleaning with ice water until clean water flushes into the waste water collecting tank. Ice water enters port 12 and is suction pumped through the branch pipe and waste is collected in tank 2. On page 6, Sameshima teaches using the method for cleaning of a piping. Sameshima fails to teach cleaning heat exchangers.

It would have been obvious to a person of ordinary skill in the art to have modified the method of Barry to include using a suction hose and pump in connection with the pipe, in order to flush ice and water through the pipe, as taught by Sameshima, thereby cleaning the interior surface of the pipe of debris. In reference to the hopper, Barry et al. teach various magazines such as hoppers (Fig. 11), for storing ice particles and further transporting the pipe in the piping for cleaning. Additionally, it is conventional in the art to use hoppers for the generation and storage of ice particles (US5934566).

Barry in view of Sameshima fail to teach the limitations directed to the principle of reverse-flow. Withers Jr. teaches cleaning heat exchanger tubes by periodically reversing the fluid flow in order to remove coating deposits. It would have been obvious to a person of ordinary skill in the art to modify the method of Barry to include reverse flow, as taught by Withers, for purposes of effectively removing contaminants from the interior surface of the heat exchanger tubes. Additionally, the concept of enhanced cleaning by reverse flow is notoriously well known and conventionally practiced in the art (Thomas, 4,054,150; Edstrand et al. 5,680,877).

Barry in view of Sameshima and Withers fail to teach a copper coil pipe. Leon teaches that it is well known in the art that heat exchangers are conventionally made of copper coils (col. 1, lines 43-45). Therefore, it would have been within the level of the skilled artisan to clean copper coil piping since Barry teaches heat exchangers and heat exchangers are typically made of copper coil piping.

Barry in view of Sameshima and Withers Jr fail to teach a transparent portion of the ice feeding hose, as recited in claim 8. However, it would have been within the level of the skilled artisan to modify the method of Barry et al. to include a transparent hose since Barry teaches the need to detect the completion of the cleaning cycle by observing whether ice flows into the waste water collecting tank at a faster velocity. In reference to claim 10, it would have been within the level of the skilled artisan to adjust the ratio of ice to water in order to form an effective composition which would be easily flowable, yet effective for scrubbing the interior surface of the pipe. In reference to claim 12, Barry et al., (col. 3, lines 35-40) teaches that the diameter of the pig is

selected to permit it to penetrate the lumen of the contaminated tube. Given the teachings of Barry et al, it would have been well within the level of the skilled artisan to modify the size of the ice cube depending upon the diameter of the heat exchange tubing being cleaned and the amount of contaminants present therein.

6. Claims 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barry (42724007) in view of Sameshima (JP01-028625) and further in view of Williams Jr. (5499639).

7. Barry teaches a method of cleaning pipes and tubes, in heat exchangers, using ice in combination with water (Abstract, col. 2, lines 60-65, col. 4, lines 25-45). Barry fails to teach the limitations of connecting the suction hose to the pipe and suction pump, connecting the ice-feeding hose to the pipe and supplying ice and water from the hopper into the pipe. In reference to simultaneously cleaning a plurality of coil pipes, col. 5, lines 19-35 teaches that the method of Barry can be used to sequentially clean teach tube or simultaneously clean a selected number of tubes.

Sameshima teaches flushing a pipe using a carriage 1 with a suction pipe mounted thereon and waste water collecting tank 2 (Fig. 1, page 3). On page 5, Sameshima teaches cleaning with ice water until clean water flushes into the waste water collecting tank. Ice water enters port 12 and is suction pumped through the branch pipe and waste is collected in tank 2. On page 6, Sameshima teaches using the method for cleaning of a piping. Sameshima fails to teach cleaning heat exchangers.

It would have been obvious to a person of ordinary skill in the art to have modified the method of Barry to include using a suction hose and pump in connection

with the pipe, in order to flush ice and water through the pipe, as taught by Sameshima, thereby cleaning the interior surface of the pipe of debris. In reference to the hopper, Barry et al. teach various magazines such as hoppers (Fig. 11), for storing ice particles and further transporting the pipe in the piping for cleaning. Additionally, it is conventional in the art to use hoppers for the generation and storage of ice particles (US5934566).

Barry in view of Sameshima fails to teach the inlet and outlet headers of the heat exchangers, as recited in claim 13. Williams teaches that it is well known and conventional for heat-exchangers to have inlet and outlet headers 24, 32, to provide communication between the plurality of tubes and manifold chamber. Williams further teaches applying a fluid media comprising a cleaning solid to each one of the headers to clean the heat exchanger (col. 3, lines 10-23, lines 55-60). It would have been obvious to the skilled artisan to have modified the method of Barry to include headers, since Williams teaches that headers are conventionally used in heat exchangers to communicate the tubes to the manifold chamber and further teaches headers which serve as inlet and outlets for delivery of the cleaning media.

In reference to claims 14-16, refer the teachings of Williams. Additionally, it would have been within the level of the skilled artisan to repeat the cleaning process in order to further remove contaminants and to achieve a desired level of cleanliness within the interior of the tubing. In reference to claim 17, refer to Fig. 1 of Barry which illustrates the coil pipe 11 are non-corrugated.

Response to Arguments

8. The objection to the specification, under 35 U.S.C. 132 (a) is withdrawn in view of arguments presented by applicant.

9. The rejection of the claims, under 112, first paragraph, as lack of written description is withdrawn in view of the corrections and arguments presented by applicant.

10. The rejection of the claims, under 112, second paragraph is withdrawn in view of arguments presented by applicant.

11. Applicant continues to argue that Barry et al. is limited to a pig of generally an inner pipe conforming size and therefore, its disclosure cannot be expanded to the speculative use of ice/water slurry by mere application of suction. Therefore, Barry cannot constitute as a proper reference. Applicant further argues that Barry clearly does not teach ice having a small enough diameter to be pulled into and through the tube by suction. Applicant argues that Barry fails to teach using a pig of a smaller size in cleaning the heat exchanger tubes. Applicant's arguments are unpersuasive for the following reasons. Col. 3, lines 55-57 teaches using pigs of small clearance in the tube. Col. 4, lines 25-30 teaches using an ice pig and further teaches the pig in combination with water. Col. 4, lines 5-10 teaches that the pig is dimensioned to provide high velocity and travel in the tube propelled by the liquid . Therefore, since Barry teaches using ice/water and further teaches varying the pig dimension to fit the tube, a small pipe would require a pig with a small clearance and therefore the use of ice/water mixture. Additionally, any ice/water slurry mixture would meet the criteria of

providing high velocity and the ability to travel in the tube propelled by liquid water. Further, it is notoriously well known in the art, as further evidenced by Sameshima, to clean pipes using ice/water slurry mixtures.

12. Applicant argues that the diameter of the pig, as taught by Barry, is selected to permit the pig to penetrate the lumen of the contaminated tube, and therefore the pig must conform to the size of the tubing. Applicant's arguments are not persuasive because the flow of an ice/water slurry mixture would certainly also penetrate the lumen of the contaminated tube.

13. Applicant further cites col. 3, lines 36-53 for support of using pigs with larger diameters. While it is true that Barry teaches using pigs of larger diameters, Barry also teaches that pigs of smaller diameters as well (col. 3, lines 55-57) and further teaches in col. 4, lines 5-10 that it is within the level of the skilled artisan to adjust the dimensions of the pig, provided the pig can travel in the tube at high velocity. Barry teaches adjusting the dimension of the pig depending upon the size of the tube.

14. Applicant argues that the ice pig may jam an oval tube and therefore it is undesirable to use an ice pig. Applicant argues that jamming of ice in the tubes is a recognized problem, and therefore, the skilled artisan would not use mere suction. Applicant's arguments are not persuasive because they are not commensurate in scope with the instantly claimed invention. Applicant is not claiming cleaning an oval tube. Additionally, Barry suggests cleaning tubes with ice/water. It is only with oval tube, that the pig "may " jam. The reference states that it "may" jam, suggesting that cleaning the oval tube with "ice/water" may not necessarily jam and if it does, it is not serious.

15. Applicant further argues that Barry teaches "that it is possible to machine such a pig to fit closely the particular dimensions of a tube to be cleaned". Clearly Barry teaches that depending upon the size of the tubing to be cleaned, the dimensions of the pig are adjusted. A small tube may require a smaller size pig (i.e. ice/water slurry mixture) since all that is required is for the pig to be propelled by the liquid and travel with high velocity. Additionally, col. 4, lines 43 teach pigs can be spherical in shape which would read on an ice/ slurry mixture.

16. Applicant argues that the pig of Barry et al. would require high pressures to keep it from jamming in the tube and therefore the skilled artisan would not use suction since suction requires lower pressures. Applicant's arguments are not persuasive since they are not commensurate in scope with the instantly claimed invention. Additionally, Barry teaches adjusting the pressure depending upon the particular application (col. 4, lines 45-50). Additionally, the higher pressures are only required because the pig is being launched. The skilled artisan would recognized the advantages of using a suction means as compared to a launcher since the former would require less equipment and easier to use.

17. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a

reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

18. Applicant argues that one skilled in the art would not have a reasonable expectation of success since Barry teaches using propelled pigs instead of suction as a driving means. Applicant argues that Barry cannot be modified to include the use of suction since it would be counterproductive and diametrically opposed to the pressure propelled method. The use of suction as a driving means would not be counterproductive since it serves as an alternative means for achieving the same purpose of cleaning the interior of the pipe. Additionally, the skilled artisan would recognized the advantages of using a suction means as compared to a launcher since the former would require less equipment and easier to use.

19. Applicant argues that there is no suggestion as to how the ice pigs could be automatically transferred from a hopper without outside intervention or assistance. Applicant's arguments are unpersuasive because they are not commensurate in scope with the instantly claimed invention. Additionally, Barry teaches using a hopper in which pigs may be fed into the launcher. The modification of Barry to include a suction means would result in the pigs being fed from the hopper into the tubing and further suctioned to remove contaminants therefrom. It is well known in the art, as evidenced by Fujii (JP58-3686) to deliver ice cubes directly from a container into the piping and abrasively cleaning the piping by applying a suction means.

20. Applicant further argues that there is no reasonable expectation of success since there is no indication that the same fouling agents present in the sewer and water lines

will have the same characteristic as the heat exchangers. Applicant's arguments are unpersuasive because they are not commensurate in scope. Additionally, since both references teach cleaning the interior of the piping, one would reasonably expect the abrasive cleaning with ice cubes to remove contaminants present on the interior of the tube.

21. In reference to claims 13-17, Applicant argues that Barry fails to teach a method of cleaning tubes by simultaneous passage through at least two coil pipes. Applicant's arguments are unpersuasive since col. 5, lines 19-35 teaches that the method of Barry can be used to sequentially clean each tube or simultaneously clean a selected number of tubes.

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheridan Carrillo whose telephone number is 571-272-1297. The examiner can normally be reached on M-W 6:30-4:00pm, alternating Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sharidan Carrillo
Primary Examiner
Art Unit 1746

bsc

SHARIDAN CARRILLO
PRIMARY EXAMINER